

Mutagenic Evaluation of Compound FDA 73-81
6/15/75

Benzoyl Peroxide Lucidol-78 (wet)

C5

LBI PROJECT #2468

MUTAGENIC EVALUATION OF

COMPOUND FDA 73-81

000094360

BENZOYL PEROXIDE
LUCIDOL-78 (wet)

SUBMITTED TO

FOOD & DRUG ADMINISTRATION
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
ROCKVILLE, MARYLAND

SUBMITTED BY

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EVALUATION SUMMARY

Compound FDA 73-81, Benzoyl Peroxide Lucidol-78 (wet), did not exhibit genetic activity in any of the in vitro microbial assays employed in this evaluation.



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DATE: June 15, 1975

SPONSOR: Food and Drug Administration, Contract Number 223-74-2104

SUBJECT: Evaluation of Test Compound 000094360, Benzoyl Peroxide Lucidol-78
(wet) FDA 73-81

I. OBJECTIVE

The objective of this study was to evaluate the test compound for genetic activity in microbial assays with and without the addition of mammalian metabolic activation preparations.

II. MATERIALS

A. Test Compound

1. Date Received: August, 1974
2. Description: White powder

B. Indicator Microorganisms

The following strains of indicator microorganisms were used in the evaluation:

Yeast Strain: Saccharomyces cerevisiae, strain D4

Bacteria Strains: Salmonella typhimurium, strains: TA-1535
TA-1537
TA-1538

C. Reaction Mixture

The following reaction mixture was employed in the activation tests:

<u>Component</u>	<u>Final Concentration/ml</u>
1. TPN (sodium salt)	6 μ M
2. Isocitric acid	49 μ M
3. Tris buffer, pH 7.4	28 μ M
4. $MgCl_2$	1.7 μ M
5. Tissue homogenate fraction	72 mg



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D. Tissue Homogenates and Supernatants

The tissue homogenates and 9,000 x g supernatants were prepared from tissues of the following mammalian species: Mouse-ICR random bred adult males; rat-Sprague-Dawley adult males; and primate-Macaca mulatta adult males.

E. Positive Control Compounds

Table 1 lists chemicals for positive controls in the direct and activation assays.

TABLE 1
POSITIVE CONTROLS USED IN DIRECT AND ACTIVATION ASSAYS

<u>Assay</u>	<u>Chemical^a</u>	<u>Solvent</u>	<u>Probable Mutagenic Specificity</u>
Nonactivation	Ethyl methanesulfonate	Water or saline	BPS ^b
	2-Nitrofluorene	Dimethylsulfoxide ^c	FS ^b
	Quinacrine mustard	Water or saline	FS ^b
Activation	Dimethylnitrosamine	Water or saline	BPS ^b
	2-Acetylaminofluorene	Dimethylsulfoxide ^c	FS ^b

^a Concentrations given in the Results Section

^b BPS = base-pair substitution; FS = frameshift

^c Previously shown to be non-mutagenic

III. METHODS

A. Toxicity

The solubility, toxicity and doses for all chemicals were determined prior to screening.

Each chemical was tested for survival against the specific indicator strains over a range of doses to determine the 50% survival dose. Bacteria were tested in phosphate buffer, pH 7.4, for one hour at 37°C on a shaker. Yeasts were tested in phosphate buffer, pH 7.4, for four hours at 30°C on a shaker. The 50% survival curve and the 1/4 and 1/2 50% doses calculated.

If no toxicity was obtained for a chemical with a given strain, then a maximum dose of 5% (w/v) was used against the strain.

Unless otherwise specified, the doses calculated for the tests in buffer were applied to the activation tests. The solubility of the test chemical under treatment conditions is stated in the Results Section.



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B. Plate Tests

In the nonactivation procedure, approximately 10^9 cells of a log phase culture of the bacterial indicator strains were spread over the surface of a minimal plate, and a measured amount of the test chemical was placed in the center of the test plate. In activation tests, the test chemical was added to the cells, and an aliquot of the mixture was spread on the surface of the test plate. The reaction mixture (0.1 ml) plus tissue extract was then spotted on the surface of the plate. Positive and solvent controls were included. All plates were incubated at 37°C for four days and then scored. Each compound (Test, Positive Control and Solvent Control) was done in duplicate. Concentrations of the positive control compounds are listed in the Results Section.

C. Suspension Tests

1. Nonactivation

Log-phase bacteria and stationary-phase yeast cultures of the indicator organisms were grown in complete broth, washed and resuspended in 0.9% saline to densities of 1×10^9 cells/ml and 5×10^7 cells/ml, respectively. This constituted the working stock for tests of a group of test chemicals and their respective controls. Tests were conducted in plastic tissue culture plates. Cells plus appropriate volume(s) of the test chemical were added to the wells to give a final volume of 1.5 ml. The solvent replaced the test chemical in the negative controls. Treatment was at 30°C for four hours for yeast tests and at 37°C for one hour for bacterial tests. All flasks were shaken during treatment. Following treatment, the plates were set on ice. Aliquots of cells were removed, diluted in sterile saline (4°C) and plated on the appropriate complete media. Undiluted samples from flasks containing the bacteria were plated on minimal selective medium in reversion experiments. Samples from a 10^{-1} dilution of treated cells were plated on the selected media for enumeration of gene conversion with strain D4. Bacterial plates were scored after incubation for 48 hours at 37°C. The yeast plates were incubated at 30°C for 3-5 days before scoring.

2. Activation

Bacteria and yeast cells were grown and prepared as described in the nonactivation tests. Measured amounts of the test and control chemicals plus 0.25 ml of the stock-cell suspension were added to wells of the Linbro plate containing the appropriate tissue fraction and reaction mixture. All flasks (bacteria and yeast) were incubated at 37°C in an oxygen atmosphere with shaking. The treatment times as well as the dilutions, plating procedures and scoring of the plates were the same as described for nonactivation tests.



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D. Preparation of Tissue Homogenates and 9,000 x g Cell Fractions

Male animals (sufficient to provide the necessary quantities of tissues) were killed by cranial blow, decapitated and bled. Organs were immediately dissected from the animal using aseptic techniques and placed in ice-cold 0.25 M sucrose buffered with Tris at pH of 7.4. Upon collection of the desired quantity of organs, they were washed twice with fresh buffered sucrose and completely homogenized with a motor-driven homogenizing unit at 4°C. The whole organ homogenate obtained from this step was divided into two samples. One sample was frozen at -80°C and the other was centrifuged for 20 minutes at 9,000 x g in a refrigerated centrifuge. The supernatant from the centrifuged sample was retained and frozen at -80°C. These two frozen samples were used for the activation studies.

E. Data Recording and Reporting

Following the specified incubation periods all population plates were scored by an automatic colony counter and the results from each plate of a set were recorded, in ink, on data processing forms. All minimal or other types of selective media plates were hand scored and the results recorded along with the respective population data. Other relevant experimental data were recorded on experimental definition forms. For bacteria strains the number of colonies recorded from either the population or selective plates represents that number in 1 ml of test suspension plated. The numbers recorded for the yeast strain D4 represent the number in 0.5 ml of test suspension plated. The data were then processed and printed from a computer program.



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IV. RESULTS SECTION

A. Solubility Properties of the Test Compound

1. Name or code designation of the test compound: 000094360
Benzoyl Peroxide Lucidol - 78 (wet)
2. Test solvent: DMSO
3. Solubility of the test compound under treatment conditions:
Insoluble under treatment conditions.
4. Additional comments: White powder

B. Toxicity and Dosage Determinations for the Test Compound

1. Test date for toxicity determination: April 11, 1975
2. The 50% survival level was determined for bacteria and yeast indicator organisms by conducting survival curves with the test compound at the following concentrations:

Percent Concentration (w/v or v/v)

10.0
1.0
0.1
0.01
0.001

3. Concentrations of the test compound used in the mutagenicity tests:

<u>Dose</u>	<u>Percent Concentration</u>	
	<u>Bacteria</u>	<u>Yeast</u>
1/4 50% Survival	0.0938	0.375
1/2 50% Survival	0.1875	0.750
50% Survival	0.3750	1.500
Plate Tests	0.1875	--



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V. SUMMARY OF TEST RESULTS

Plate Tests

A. Name or code designation of the test compound: 000094360

B. Test date: April 21, 1975

C. Concentration of the test compound: 0.1875%

Test	Species	Tissue	REVERTANTS/PLATE					
			TA-1535		TA-1537		TA-1538	
			1	2	1	2	1	2
1. <u>Non-activation</u>								
Solvent Control	---	---	3	4	22	33	7	11
Positive Control ^a	---	---	>10 ³	>10 ³	138	133	146	138
Test Compound	---	---	7	4	23	25	15	8
2. <u>Activation</u>								
Negative Control	---	---	6	4	27	23	7	14
Solvent Control	---	---	10	12	36	43	16	18
Reaction Mixture Control	---	---	9	7	36	39	19	23
Positive Control ^b	Mouse	Liver	>10 ³	>10 ³	96	93	333	317
Positive Control		Lung	9	7	33	33	21	26
Positive Control		Testes	7	2	37	32	18	11
Positive Control	Rat	Liver	>10 ³	>10 ³	84	80	314	317
Positive Control		Lung	11	6	32	35	15	18
Positive Control		Testes	6	5	24	43	20	9
Positive Control	Monkey	Liver	>10 ³	>10 ³	97	93	111	155
Positive Control		Lung	8	5	32	38	13	15
Positive Control		Testes	8	2	28	33	12	8
Test Compound	Mouse	Liver	8	2	26	35	4	3
Test Compound		Lung	4	1	20	23	5	4
Test Compound		Testes	4	5	18	18	4	3
Test Compound	Rat	Liver	11	1	25	37	1	4
Test Compound		Lung	4	1	19	14	4	4
Test Compound		Testes	4	4	21	19	2	3
Test Compound	Monkey	Liver	9	2	26	35	1	4
Test Compound		Lung	2	1	19	15	6	4
Test Compound		Testes	4	4	19	20	2	3

a TA-1535 EMS 10 µl/plate
TA-1537 QM 20 µg/plate
TA-1538 NF 100 µg/plate

b TA-1535 DMNA 50 µM/plate
TA-1537 AAF 100 µg/plate
TA-1538 AAF 100 µg/plate



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DATA TABLE TERMS AND ABBREVIATIONS

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
COMPOUND	Client designated compound number appears in this column.
TEST CODES	<p> NAN = Nonactivation: Solvent Control NAP = Nonactivation: Positive Control NA1 = Nonactivation: Test Compound Dose 1 NA2, etc. = Reflects the other dose level(s) </p> <p> A+C = Negative Chemical Control A-C = Activation: Solvent Control ACP = Activation: Positive Control ACT = Activation: Test Compound A+T = Activation: Tissue Control </p> <p> LI = Liver Tissue Activation Fraction LU = Lung Tissue Activation Fraction KI = Kidney Tissue Activation Fraction TE = Testes Tissue Activation Fraction 1,2, etc. = Dose Levels </p>
CONCENTRATION	<p>All test compound dose levels are expressed as a whole number followed by an exponent (negative) identified by the appropriate units.</p> <p>Example: 0025-2PCT = 0.25 percent concentration</p>
POPU	Total number of viable cells in the plating sample raised to some exponent printed directly below the abbreviation (i.e., EP + 6 = $\times 10^6$).
MUT 1	Total number of mutants or convertants obtained from the sample plated raised to some exponent printed directly below the abbreviation (i.e., EP + 0 = 10^0). For strain D4, MUT 1 represents the number of ADE+ convertants.
MUT 2	Only used for strain D4 and represents the number of TRY+ convertants in the plated sample.
FREQ 1	The calculated mutation or gene conversion frequency times the negative exponent written directly below. For strain D4, FREQ 1 represents the ADE+ value.
FREQ 2	Only used for strain D4 and represents the TRY+ conversion frequency.
CONTAM	Presence of contamination on any plates.



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DATA TABLE TERMS AND ABBREVIATIONS (continued)

ABBREVIATION OR TERM	DEFINITION OR EXPLANATION
AAF	2-Acetylaminofluorene
DMSO	Dimethylsulfoxide
DMN	Dimethylnitrosamine
EMS	Ethyl Methanesulfonate
QM	Quinacrine Mustard
NF	Nitrofluorene
SPECIES	Animal Strains
SPRDAW	Sprague Dawley Rats
ICRFLO	Flow ICR Random Bred Mice
RHESUS	Rhesus Monkey (<u>Macaca mulatta</u>)
MIXEDB	Dog, Mixed Breed
NEWZEA	New Zealand White Rabbit



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES /

COMPOUND 000094360

TEST	ORG	TA1538 HIS EX-8	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1535 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
MAN		10.14	5.32	1.24	12.94	1.89	1.48
NAP			1764.20	922.93	771.32	129.05	155.87
NA1		8.68	3.42	100.00	3.58	0.44	0.22
NA2			7.37	0.79	1.82	0.18	0.18



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES ICRFLO/MOUSE

COMPOUND 000094360

TEST	ORG	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1535 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	20.45	6.88	3.23			2.25	1.59
ACT	A+T	35.90	6.31	7.69			3.25	1.59
ACT	A-C	12.22	2.93	3.73	3.54	1.82	0.96	0.17
ACT	PLI	45.07	15.26	5496.88			7.59	6.16
ACT	PLU	20.50	4.48	4.79			2.42	2.60
ACT	PTE	28.79	2.33	9.15			3.81	2.06
ACT	LI1	17.70	8.02	3.93			2.42	2.18
ACT	LI2	11.06	8.33	10.08			2.13	2.34
ACT	LU1	17.43	4.62	3.34	1.69	1.92	0.00	0.00
ACT	LU2	13.35	5.87	5.03			0.67	0.56
ACT	TE1	13.28	4.46	10.94	3.92	2.65	0.00	0.00
ACT	TE2	11.76	6.05	5.73			1.02	0.51



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES SPRDAM/RAT

COMPOUND 000094360

TEST	ORG	TA1537 HIS EX-8	TA1538 HIS EX-8	TA1535 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	10.86	4.75	4.48	2.65	2.37
ACT	A+T	10.31	6.57	2.48	3.90	3.90
ACT	A-C	8.87	9.05	5.52	2.94	3.03
ACT	PLI	17.19	20.33	333.15	7.37	9.16
ACT	PLU	14.09	8.76	6.11	3.32	19.54
ACT	PTE	11.40	6.77	8.60	3.84	4.23
ACT	LI1	7.54	2.49	5.46	1.82	1.82
ACT	LI2	13.82	4.84	4.86	1.74	2.02
ACT	LU1	9.47	3.49	4.93	0.53	2.12
ACT	LU2	10.10	5.83	7.21	2.41	1.47
ACT	TE1	12.22	8.92	4.90	2.04	3.57
ACT	TE2	12.27	9.01	12.58	1.75	2.30



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LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
REPORT EXR34

COMPOUND FREQUENCY SUMMARY REPORT 07/08/75

SPECIES RHESUS/MONKEY

COMPOUND 000094360

TEST	ORG	TA1537 HIS EX-8	TA1535 HIS EX-8	TA1538 HIS EX-8	000004 ADE EX-5	000004 TRY EX-5
ACT	A+C	6.36	4.50	10.43	1.82	1.82
ACT	A+T	3.92	5.62	5.80	2.59	2.73
ACT	A-C	5.63	7.72	2.70	2.16	1.80
ACT	PLI	10.56	1194.98	54.55	6.38	3.75
ACT	PLU	5.60	5.81	5.22	2.40	2.64
ACT	PTE	8.26	3.99	6.61	5.41	2.30
ACT	LI1	7.77	1.71	7.09	1.20	0.30
ACT	LI2	7.14	3.14	3.95	1.16	0.58
ACT	LU1	8.03	1.42	3.42	1.66	1.85
ACT	LU2	6.85	5.33	2.25	1.39	1.39
ACT	TE1	4.17	4.12	3.35	2.02	1.40
ACT	TE2	5.48	2.57	2.35	1.96	1.79



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VI. INTERPRETATION OF RESULTS AND CONCLUSIONS

Compound 000094360, Benzoyl Peroxide Lucidol-78 (wet), was tested for genetic activity in a series of in vitro microbial assays with and without metabolic activation. The following results were obtained:

A. Salmonella typhimurium

1. Plate Tests

At a concentration of 0.1875%, 000094360, was not mutagenic with or without activation for any of the bacterial indicator strains.

2. Nonactivation suspension tests

The results of these tests were negative. The NA 1 dose level with TA-1538 was repeated because of a low surviving population count. The repeat test was negative.

3. Activation suspension tests

The results of these tests were negative.

B. Saccharomyces cerevisiae

1. Nonactivation suspension tests

The results of these tests were negative.

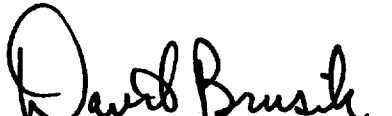
2. Activation suspension tests

The results of these tests were negative. The LU 1 and TE 1 doses using mouse tissues were repeated because of low population counts. The repeat tests were negative.

C. Conclusions

The test compound Benzoyl Peroxide Lucidon-78 (wet) did not exhibit genetic activity in any of the assays employed in this evaluation.

Submitted by:


David Brusick, Ph.D.
Director of Genetics



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APPENDIX
Tabulation of Data



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468			
EXPERIMENT 509802		DETECTOR TA1535		SPECIES /		DATE - 07/08/75	
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		SALINE	0487	0063	12.94	0
	NAP		FMS 0.002 %	0537	4142	771.32	0
000094360	NA1		1875-4 PCT.	0419	0015	3.58	0
000094360	NA2		0938-4 PCT.	0439	0008	1.82	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104		PROJECT 02468		DATE = 07/08/75			
EXPERIMENT 511301	DETECTOR TA1537	SPECIES /					
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FRE01 EP-8	CONTAM
	NAN		SALINE	0601	0032	5.32	0
	NAP		QM 1.0 UG/ML	0257	4534	1764.20	0
000094360	NA1		1875-4 PCT.	0439	0015	3.42	0
000094360	NA2		0938-4 PCT.	0448	0033	7.37	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468		DATE - 07/08/75	
EXPERIMENT 509803		DETECTOR TA1538		SPECIES /			
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	NAN		DMSO	0563	0007	1.24	0
	NAP		NF 125 UG-ML	0567	5233	922.93	0
000094360	NA1		1875-4 PCT.	0002	0002	100.00	0
000094360	NA2		0938-4 PCT.	0380	0003	0.79	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468		DATE - 07/08/75	
EXPERIMENT 512702		DETECTOR TA1538		SPECIES /			
COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-R	CONTAM
	NAN		DMSO	0365	0037	10.14	0
000094360	NA1		1875-4 PCT.	0357	0031	8.68	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468				DATE - 07/08/75	
EXPERIMENT 514705		DETECTOR 000004		SPECIES		/			
COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	NAN		SALINE	0741	0014	0011	1.89	1.48	0
	NAP		FMS 1.0 %	0179	0231	0279	129.05	155.87	0
000094360	NA1		0075-2 PCT.	0452	0002	0001	0.44	0.22	0
000094360	NA2		0375-3 PCT.	0559	0001	0001	0.18	0.18	0



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COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 509401 DETECTOR TA1535 SPECIES ICRFLD/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP1 EP+6	MUT1 EP+0	FRF01 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0650	0021	3.23	0
	A+T		***NO MATCH***	0156	0012	7.69	0
	A-C		SALINE	0670	0025	3.73	1
	ACP	LI	DMN 50 UM/ML	0096	5277	5496.88	0
	ACP	LU	DMN 50 UM/ML	0313	0015	4.79	0
	ACP	TE	DMN 50 UM/ML	0153	0014	9.15	0
000094360	ACT	LI1	1875-4 PCT.	0382	0015	3.93	2
000094360	ACT	LI2	0938-4 PCT.	0238	0024	10.08	2
000094360	ACT	LU1	1875-4 PCT.	0299	0010	3.34	0
000094360	ACT	LU2	0938-4 PCT.	0298	0015	5.03	0
000094360	ACT	TF1	1875-4 PCT.	0320	0035	10.94	0
000094360	ACT	TF2	0938-4 PCT.	0663	0038	5.73	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517602 DETECTOR TA1537 SPECIES ICRFLD/MOUSE

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0308	0063	20.45	0
	A+T		***NO MATCH***	0078	0028	35.90	1
	A-C		DMSO	0483	0059	12.22	0
	ACP	LI	AAF 800 UG/ML	0071	0032	45.07	1
	ACP	LU	AAF 800 UG/ML	0161	0033	20.50	0
	ACP	TE	AAF 800 UG/ML	0198	0057	28.79	0
000094360	ACT	LI1	1875-4 PCT.	0322	0057	17.70	0
000094360	ACT	LI2	0938-4 PCT.	0398	0044	11.06	0
000094360	ACT	LU1	1875-4 PCT.	0218	0038	17.43	2
000094360	ACT	LU2	0938-4 PCT.	0322	0043	13.35	0
000094360	ACT	TE1	1875-4 PCT.	0384	0051	13.28	0
000094360	ACT	TE2	0938-4 PCT.	0289	0034	11.76	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

		CONTRACT 22374-2104		PROJECT 02468		DATE - 07/08/75	
EXPERIMENT 509701		DETECTOR TA1538		SPECIES ICRFL0/MOUSE			
COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0858	0059	6.88	0
	A+T		***NO MATCH***	0666	0042	6.31	0
	A-C		DMSO	0819	0024	2.93	0
	ACP	LI	AAF 800 UG/ML	0675	0103	15.26	0
	ACP	LU	AAF 800 UG/ML	1026	0046	4.48	2
	ACP	TE	AAF 800 UG/ML	0945	0022	2.33	0
000094360	ACT	LI1	1875-4 PCT.	0486	0039	8.02	2
000094360	ACT	LI2	0938-4 PCT.	0516	0043	8.33	2
000094360	ACT	LU1	1875-4 PCT.	0498	0023	4.62	0
000094360	ACT	LU2	0938-4 PCT.	0494	0029	5.87	0
000094360	ACT	TE1	1875-4 PCT.	0628	0028	4.46	0
000094360	ACT	TE2	0938-4 PCT.	0529	0032	6.05	2



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 512601 DETECTOR 000004 SPECIES ICRFLO/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPU EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0755	0017	0012	2.25	1.59	0
	A+T		***NO MATCH***	1260	0041	0020	3.25	1.59	6
	A-C		SALINE	1145	0011	0002	0.96	0.17	0
	ACP	LI	DMN 90 UM/ML	0909	0069	0056	7.59	6.16	6
	ACP	LU	DMN 90 UM/ML	1117	0027	0029	2.42	2.60	0
	ACP	TE	DMN 90 UM/ML	0970	0037	0020	3.81	2.06	6
000094360	ACT	LI1	0075-2 PCT.	0827	0020	0018	2.42	2.18	2
000094360	ACT	LI2	0375-3 PCT.	0940	0020	0022	2.13	2.34	6
000094360	ACT	LU1	0075-2 PCT.	0077	0000	0000	0.00	0.00	0
000094360	ACT	LU2	0375-3 PCT.	0893	0006	0005	0.67	0.56	0
000094360	ACT	TF1	0075-2 PCT.	0007	0000	0000	0.00	0.00	3
000094360	ACT	TE2	0375-3 PCT.	0393	0004	0002	1.02	0.51	6



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517003 DETECTOR 000004 SPECIES ICRFL0/MOUSE DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POP0 EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A-C		SALINE	0990	0035	0018	3.54	1.82	1
000094360	ACT	LU1	0075-2 PCT.	0887	0015	0017	1.69	1.92	2
000094360	ACT	TE1	0075-2 PCT.	0867	0034	0023	3.92	2.65	3



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 510801 DETECTOR TA1535 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	PNPU EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0692	0031	4.48	0
	A+T		***NO MATCH***	0483	0012	2.48	3
	A-C		SALINE	0725	0040	5.52	0
	ACP	LI	DMN 50 UM/ML	0368	1226	333.15	1
	ACP	LU	DMN 50 UM/ML	0311	0019	6.11	0
	ACP	TE	DMN 50 UM/ML	0349	0030	8.60	0
000094360	ACT	LI1	1875-4 PCT.	0403	0022	5.46	2
000094360	ACT	LI2	0938-4 PCT.	0494	0024	4.86	3
000094360	ACT	LU1	1875-4 PCT.	0426	0021	4.93	2
000094360	ACT	LU2	0938-4 PCT.	0333	0024	7.21	2
000094360	ACT	TE1	1875-4 PCT.	0490	0024	4.90	0
000094360	ACT	TE2	0938-4 PCT.	0445	0056	12.58	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 511501 DETECTOR TA1537 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPJ EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0663	0072	10.86	0
	A+T		***NO MATCH***	0446	0046	10.31	0
	A-C		DMSO	0688	0061	8.87	0
	ACP	LI	AAF 800 UG/ML	0512	0088	17.19	2
	ACP	LU	AAF 800 UG/ML	0589	0083	14.09	0
	ACP	TE	AAF 800 UG/ML	0544	0062	11.40	0
000094360	ACT	LI1	1875-4 PCT.	0610	0046	7.54	2
000094360	ACT	LI2	0938-4 PCT.	0340	0047	13.82	0
000094360	ACT	LU1	1875-4 PCT.	0486	0046	9.47	0
000094360	ACT	LU2	0938-4 PCT.	0505	0051	10.10	0
000094360	ACT	TE1	1875-4 PCT.	0491	0060	12.22	0
000094360	ACT	TE2	0938-4 PCT.	0383	0047	12.27	3



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 511801 DETECTOR TA1538 SPECIES SPRDAW/RAT

DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0926	0044	4.75	0
	A+T		***NO MATCH***	0792	0052	6.57	0
	A-C		DMSO	0707	0064	9.05	0
	ACP	LI	AAF 800 UG/ML	0718	0146	20.33	2
	ACP	LU	AAF 800 UG/ML	0833	0073	8.76	0
	ACP	TE	AAF 800 UG/ML	0886	0060	6.77	2
000094360	ACT	LI1	1875-4 PCT.	0682	0017	2.49	2
000094360	ACT	LI2	0938-4 PCT.	0372	0018	4.84	2
000094360	ACT	LU1	1875-4 PCT.	1260	0044	3.49	0
000094360	ACT	LU2	0938-4 PCT.	0618	0036	5.83	0
000094360	ACT	TE1	1875-4 PCT.	0628	0056	8.92	0
000094360	ACT	TE2	0938-4 PCT.	0533	0048	9.01	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 517805 DETECTOR 000004 SPECIES SPRDAW/RAT DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	1055	0028	0025	2.65	2.37	0
	A+T		***NO MATCH***	0999	0039	0039	3.90	3.90	0
	A-C		SALINE	1089	0032	0033	2.94	3.03	1
	ACP	LI	DMN 90 UM/ML	1234	0091	0113	7.37	9.16	0
	ACP	LU	DMN 90 UM/ML	1295	0043	0253	3.32	19.54	6
	ACP	TE	DMN 90 UM/ML	1016	0039	0043	3.84	4.23	6
000094360	ACT	LI1	0075-2 PCT.	0110	0002	0002	1.82	1.82	0
000094360	ACT	LJ2	0375-3 PCT.	1089	0019	0022	1.74	2.02	0
000094360	ACT	LU1	0075-2 PCT.	0189	0001	0004	0.53	2.12	0
000094360	ACT	LU2	0375-3 PCT.	0954	0023	0014	2.41	1.47	7
000094360	ACT	TE1	0075-2 PCT.	0589	0012	0021	2.04	3.57	1
000094360	ACT	TE2	0375-3 PCT.	1087	0019	0025	1.75	2.30	3



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 509901 DETECTOR TA1535 SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		DMN 50 UM/ML	0756	0034	4.50	0
	A+T		***NO MATCH***	0534	0030	5.62	0
	A-C		SALINE	0479	0037	7.72	1
	ACP	LI	DMN 50 UM/ML	0458	5473	1194.98	0
	ACP	LU	DMN 50 UM/ML	0551	0032	5.81	0
	ACP	TE	DMN 50 UM/ML	0426	0017	3.99	2
000094360	ACT	LI1	1875-4 PCT.	0527	0009	1.71	0
000094360	ACT	LI2	0938-4 PCT.	0477	0015	3.14	0
000094360	ACT	LU1	1875-4 PCT.	0636	0009	1.42	0
000094360	ACT	LU2	0938-4 PCT.	0544	0029	5.33	0
000094360	ACT	TE1	1875-4 PCT.	0607	0025	4.12	0
000094360	ACT	TE2	0938-4 PCT.	0584	0015	2.57	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104 PROJECT 02468
EXPERIMENT 511901 DETECTOR TA1537 SPECIES RHESUS/MONKEY DATE - 07/08/75

COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+6	MUT1 EP+0	FREQ1 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0692	0044	6.36	0
	A+T		***NO MATCH***	0638	0025	3.92	0
	A-C		DMSO	0533	0030	5.63	0
	ACP	LI	AAF 800 UG/ML	0606	0064	10.56	0
	ACP	LU	AAF 800 UG/ML	0643	0036	5.60	0
	ACP	TE	AAF 800 UG/ML	0545	0045	8.26	0
000094360	ACT	LI1	1875-4 PCT.	0386	0030	7.77	0
000094360	ACT	LI2	0938-4 PCT.	0364	0026	7.14	0
000094360	ACT	LU1	1875-4 PCT.	0274	0022	8.03	0
000094360	ACT	LU2	0938-4 PCT.	0292	0020	6.85	0
000094360	ACT	TF1	1875-4 PCT.	0312	0013	4.17	0
000094360	ACT	TE2	0938-4 PCT.	0292	0016	5.48	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104		PROJECT 02468		DATE - 07/08/75		
EXPERIMENT 510001		DETECTOR TA1538		SPECIES RHESUS/MONKEY		
COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL MUTL EP+6 EP+0	FRF01 EP-8	CONTAM
	A+C		AAF 800 UG/ML	0748 0078	10.43	0
	A+T		***NO MATCH***	0742 0043	5.80	2
	A-C		DMSO	0742 0020	2.70	2
	ACP	LI	AAF 800 UG/ML	0638 0348	54.55	0
	ACP	LU	AAF 800 UG/ML	0901 0047	5.22	0
	ACP	TE	AAF 800 UG/ML	0681 0045	6.61	0
000094360	ACT	LI1	1875-4 PCT.	0592 0042	7.09	2
000094360	ACT	LI2	0938-4 PCT.	0608 0024	3.95	2
000094360	ACT	LU1	1875-4 PCT.	0789 0027	3.42	0
000094360	ACT	LU2	0938-4 PCT.	0756 0017	2.25	2
000094360	ACT	TE1	1875-4 PCT.	0717 0024	3.35	0
000094360	ACT	TE2	0938-4 PCT.	0807 0019	2.35	0



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REPORT EXR33 LITTON BIONETICS MUTAGENIC ACTIVITY SYSTEM
COMPOUND SUMMARY BACKUP DETAIL

CONTRACT 22374-2104			PROJECT 02468						
EXPERIMENT 514202		DETECTOR 000004		SPECIES RHESUS/MONKEY				DATE - 07/08/75	
COMPOUND	TEST	ORG ID	CONCENTRATION	POPUL EP+4	MUT1 EP+1	MUT2 EP+1	FREQ1 EP-5	FREQ2 EP-5	CONTAM
	A+C		DMN 90 UM/ML	0658	0012	0012	1.82	1.82	1
	A+T		***NO MATCH***	0695	0018	0019	2.59	2.73	1
	A-C		SALINE	0555	0012	0010	2.16	1.80	7
	ACP	LI	DMN 90 UM/ML	0799	0051	0030	6.38	3.75	0
	ACP	LU	DMN 90 UM/ML	0832	0020	0022	2.40	2.64	1
	ACP	TE	DMN 90 UM/ML	0739	0040	0017	5.41	2.30	4
000094360	ACT	LI1	0075-2 PCT.	0666	0008	0002	1.20	0.30	1
000094360	ACT	LI2	0375-3 PCT.	0691	0008	0004	1.16	0.58	4
000094360	ACT	LU1	0075-2 PCT.	0542	0009	0010	1.66	1.85	0
000094360	ACT	LU2	0375-3 PCT.	0576	0008	0008	1.39	1.39	0
000094360	ACT	TF1	0075-2 PCT.	0644	0013	0009	2.02	1.40	4
000094360	ACT	TF2	0375-3 PCT.	0613	0012	0011	1.96	1.79	0